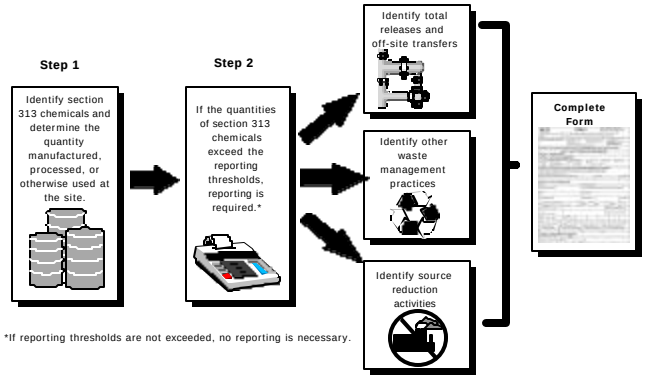
TRI RELEASE AND OTHER WASTE MANAGEMENT REPORTING

THE EPCRA SECTION 313 REPORTING PROCESS



*If reporting thresholds are not exceeded, no reporting is necessary.

SECTION 313 REPORTING

- Importance of a structured process for release and other waste management reporting
  - Ensures accurate data
  - Reduces burden in completing Form R report
    - » Systematic approach reduces redundancy over time
    - » Team approach distributes responsibility
  - Ensures compliance with TRI reporting requirements

REPORTING METHOD

- Identify potential release and other waste management sources
- Identify available data and tools
- Collect data
- Estimate quantity of chemical being released and otherwise managed as waste
- Document your work

TOOLS AND DATA SOURCES FOR CALCULATING REPORTING ESTIMATES

- Process flow diagrams
- Waste management manifests, invoices, and waste profiles
- Environmental monitoring data
- Permit applications
- RCRA (BRS), NPDES, CAA, CERCLA and other env. reports
- Engineering calculations and other notes
- EPA guidance

CALCULATING REPORTING ESTIMATES

- Consider all sources (routine and non-routine)
- Reasonable estimates required by law
- Facility determines best approach
- Data and approach must be documented

TECHNIQUES FOR ESTIMATING CHEMICAL QUANTITIES

- Use of monitoring data (M)
- Mass balance calculation (C)
- Use of emission factors (E)
- Engineering calculations (O)
- Use the code on the Form R for the method used to estimate the largest portion of the release

ANALYSIS OF MONITORING DATA

- Product of measured concentrations, volumetric flow rates, and density equals pounds of chemical released per year
- Most commonly used for wastewater (Discharge monitoring reports (DMRs))
- Use Basis of Estimate code “M” if calculations based primarily on monitoring data

MASS BALANCE CALCULATION

- Mass Balance is based on the law of conservation of mass
- Input + Generation = Output + Amount Reacted + Accumulation
- Most useful in simple situations
- Use Basis of Estimate code "C"
  - Example: Estimating wastewater releases from process

USE OF PUBLISHED EMISSION FACTORS

- Emission factors are used to describe the quantity of chemical released as a function of:
  - Specific chemical used
  - Specific process used
  - Specific equipment used
- Available in *Compilation of Air Pollutant Emission Factors (AP-42)*
- Use Basis of Estimate code "E" only when chemical-specific emission factor is used

ENGINEERING CALCULATIONS

- Calculations based on best engineering judgment/assumptions
- Calculations based on process knowledge
- Use of non-chemical-specific emission factors
- Use of non-published emission factors
- Use Basis of Estimate code "O"

NON-PBT CHEMICAL ESTIMATES

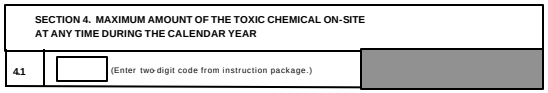
- Values for non-PBT Section 313 chemicals must be entered in whole numbers
  - EPA allows using two significant figures when reporting releases and other waste management estimates
  - If estimate is more precise, additional significant figures should be used based on precision of data used to calculate the estimate
  - For estimates of non-PBT Section 313 chemicals under 1,000 pounds, a range code can be used:
    - » A= 1-10 pounds; B = 11-499 pounds; C = 500-999 pounds

"NA" VS. "0"

- Use "NA" (not applicable) when no possibility of the Section 313 chemical being released to or otherwise managed as waste in that media (e.g., facility has no on-site landfill) or when no release to or other waste management in the specific media occurs
- Use "0" when no release occurs or ≤ 0.5 pounds of a non-PBT Section 313 chemical from a waste stream is directed towards that medium
  - Example: Discharge to water is zero; however, release possible if control equipment fails
  - Must indicate a Basis of Estimate code (i.e., M, C, E, O) for all numerical estimates, including "0"

PART II. SECTION 4: MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING YEAR

- Insert appropriate code from instructions indicating the maximum quantity on-site
- Use maximum total (non-exempt) amount present at one time during reporting year, even if the Section 313 chemical is present at more than one location at the facility
- Include amounts in storage, processes, and wastes (but not those amounts which have been previously land disposed)



PART II. SECTION 4: MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING YEAR

- Part II, Section 4.1: Maximum amount on-site at any time during the calendar year
  - Based on amount in storage, process, and wastes
  - Not the same as Tier II maximum amount on site
    - » Tier II is usually by mixtures, Form R is chemical-specific
    - » Tier II excludes hazardous wastes, Form R does not
- Data sources
  - Tier II records/calculations
  - Waste inventory data

PART II. SECTION 5: QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

- Report total releases of the Section 313 chemical to each environmental medium on-site
- In column A, Total Release, report total quantity
  - A range code can be used for non-PBT Section 313 chemical quantities less than 1,000 pounds
    - » A = 1 - 10 pounds
    - » B = 11 - 499 pounds
    - » C = 500 - 999 pounds

PART II. SECTION 5: ON-SITE AIR EMISSIONS

- **Section 5.1 Fugitive or non-point air emissions**
  - Enter total fugitive releases of the Section 313 chemical in column A, including leaks, evaporative losses, building ventilation, or other non-point air emissions
- **Section 5.2 Stack or point air emissions**
  - Enter total releases to air from point sources, including stacks, vents, pipes, ducts, storage tanks, or other confined air streams

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIU M					
			A. Total Release (pounds/ year) (enter range from instructions or estimate)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	☐ NA			
5.2	Stack or point air emissions	☐ NA			

FUGITIVE EMISSIONS

- **Part II, Section 5.1: Fugitive or non-point air emissions**
  - Approach: ID potential sources --> ID data/tools --> estimate
- **Data sources/tools**
  - Engineering calculations
  - Emission factors
  - Monitoring data
  - Mass balance

STACK EMISSIONS

- **Part II, Section 5.2: Stack or point-source air emissions**
  - Approach: ID potential sources --> ID data/tools --> estimate
  - Data sources/tools
    - Air permit applications
    - CAA Title V air inventories
    - Process and production data
    - Engineering calculations
    - Mass balance
    - Emission factors

PART II. SECTION 5: ON-SITE WASTEWATER DISCHARGES

- **Section 5.3 Releases to streams or water bodies**
  - Enter names of streams or water bodies to which your facility directly discharges the Section 313 chemical. If there is no name, enter the closest stream or water body with a name
  - Enter total amount of releases to each receiving stream or water body in column A; include amounts from stormwater runoff, if available
  - Indicate in column C the percentage of the total quantity (by weight) of the Section 313 chemical contributed by stormwater

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIU M				
5.3	Discharges to receiving streams or water bodies (enter one name per box)			
	Stream or Water Body Name	A. Total Release (pounds/year) (enter range from instructions or estimate)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.3.1				
5.3.2				
5.3.3				

WASTEWATER DISCHARGES

- **Part II, Section 5.3: Release to stream or water body and Part II, Section 6.1: Discharges to POTW**
  - Approach: ID potential sources --> ID data/tools --> estimate
- **Potential release sources**
  - Wastewater treatment facility discharge
  - Storm drains
- **Data/tools**
  - Monitoring, if available
  - DMRs or other required monitoring data
  - NPDES permits/permit applications
  - Process knowledge and/or mass balance

CALCULATING WASTEWATER DISCHARGES

- **Recommended approach: Calculate the yearly pounds of methanol discharged using the following data concerning wastewater discharges of methanol:**

Date	Conc. (mg/L)	Flow (MGD)	Amt.(lbs./day)
3/1	1.0	1.0	8.33
9/8	0.2	0.2	.33
		Average =	4.33

(4.33 lbs./day) x (365 days/yr.) = 1581 lbs./yr.

MGD = million gallons per day

1 mg/L = 8.33 lbs./million gal

PART II. SECTION 5: ON-SITE INJECTION WELLS

- **Section 5.4.1 Underground injection to Class I wells**
  - Enter total amount of Section 313 chemical injected into Class I wells at facility in column A and basis of estimate code in column B
- **Section 5.4.2 Underground injection to Class II - V wells**
  - Enter total amount of Section 313 chemical injected into Class II - V wells at facility in column A and basis of estimate code in column B

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIU M					
			A. Total Release (pound/ year) (enter range from instructions or estimate)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.4.1	Underground injections on -site to Class I Wells	☐ NA			
5.4.1	Underground injections on -site to Class IIV Wells	☐ NA			

PART II. SECTION 5: RELEASES TO LAND ON-SITE

- **Section 5.5 Releases to land on-site**
  - Other disposal (5.5.4) includes spills or leaks of the Section 313 chemical to land
  - Quantities of Section 313 chemicals released to air or water during the reporting year of the initial release to land (e.g., volatilizat ion from surface impoundments) are not included here

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIU M				
		NA	A. Total Release (pound/ year) (enter range code from instructions or estimate)	B. Basis of Estimate (enter code)
5.5	Disposal to land on-site			
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3	Surface impoundment	☐		
5.5.4	Other disposal	☐		

RELEASED TO LAND ON-SITE

- Approach: ID potential sources --> ID data/tools --> estimate
- Potential sources of release to land
  - Intentional storage or disposal in on-site units
  - Spills
  - Leaks
- Data/tools:
  - Operating records/analytical data
  - Spill reports
  - Process knowledge

CHEMICAL MIGRATION GUIDANCE

- Migration of reportable chemical within one environmental medium (e.g., from land to land: landfill leaching into soil)
  - Only required to report initial release of chemical to the environment
- Migration of chemical from one environmental medium to another (e.g., from land to air: volatilization from a lagoon) within the reporting year
  - Release estimates should be calculated and reported for all media in Part II, Sections 5, 6, and 8 of Form R

WASTE RELEASED TO LAND ON-SITE--STORAGE

- Storage of wastes on the land
  - Regular shipment schedule
    - » Must transfer the waste off-site before that reporting year's Form R report is submitted or July 1, whichever comes first
    - » Report material transferred off-site during the year in Part II, Section 6 of Form R
  - No regular shipment schedule
    - » Report material added to pile that remains on-site during the year as the quantity released to land, Part II, Section 5.5.4 of Form R

PART II. SECTION 6: TRANSFERS TO OFF-SITE LOCATIONS

- Includes both off-site location information and quantities of Section 313 chemicals transferred to off-site locations
- Report quantities of a Section 313 chemical sent off-site to any POTW or other location for recycling, energy recovery, waste treatment, or disposal
- Report only total quantity of a Section 313 chemical transferred off-site, not entire waste
- In Sections 6.1 and 6.2, Total Transfers, report total quantity
  - A range code can be used for non-PBT Section 313 chemical quantities less than 1,000 pounds
    - » A = 1 - 10 pounds
    - » B = 11 - 499 pounds
    - » C = 500 - 999 pounds

PART II. SECTION 6: TRANSFERS TO POTWs

- **Section 6.1 Discharges to publicly owned treatment works**
  - Enter total quantity of the Section 313 chemical transferred to all POTWs and basis of estimate

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS	
6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)	
6.1.A Total Quantity Transferred to POTWs and Basis of Estimate	
6.1.A.1 **Total Transfers** (pounds/year) (enter range code or estimate)	6.1.A.2 **Basis of Estimate** (enter code)

PART II. SECTION 6: TRANSFERS TO POTWs

- **Section 6.1.B POTW name and location**
  - Include name and address of each POTW
  - Photocopy page 3 if reporting discharges to more than 2 POTWs (TRI-ME/ATRS accommodates this without photocopying)

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS						
6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)						
6.1.B. ___	POTW Name					
	POTW Address					
City		State		County		Zip
6.1.B. ___	POTW Name					
	POTW Address					
City		State		County		Zip

PART II. SECTION 6: TRANSFERS TO OTHER OFF-SITE LOCATIONS

- **Section 6.2 Transfers to other off-site locations**
  - Include name, address, and EPA identification (RCRA ID) number
  - Enter quantities, basis of estimate, and codes for multiple activities (waste treatment, disposal, recycling, and energy recovery) in Rows 1 through 4
  - Photocopy page 4 if reporting more than 2 off-site transfer locations (TRI-ME/ATRS accommodates this without photocopying)

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS		
6.2. OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)		
Off-site Location Name		
Off-site Address		
City / State / County / Zip / Country (Non-US)		
Is location under control of reporting facility or parent company? ☐ Yes ☐ No		
A. **Total Transfers** (pounds/year) (enter range code or estimate)	B. **Basis of Estimate** (enter code)	C. **Type of Waste Treatment Disposal/ Recycling/Energy Recovery** (enter code)
1.	1.	1.M
2.	2.	2.M
3.	3.	3.M
4.	4.	4.M

OFF-SITE WASTE MANAGEMENT

- **Approach: ID potential sources --> ID data/tools --> estimate**
- **Potential sources of off-site waste management**
  - Identify final disposition of the Section 313 chemical
    - Disposal
    - Waste treatment
    - Energy recovery
    - Recycling
- **Data/tools**
  - Waste manifests and vendor receipts
  - RCRA reports
  - Waste characterization - analyses, profiles

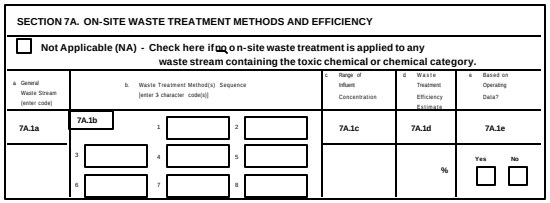
PART II. SECTION 7: ON-SITE WASTE MANAGEMENT

Examples of on-site waste management (Section 7)

- Air pollution control devices (Section 7A)
- Wastewater treatment processes (Section 7A)
- Energy recovery devices (Section 7B)
- Recycling devices (Section 7C)

PART II. SECTION 7A: ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

- Report each waste treatment method that the Section 313 chemical undergoes
  - Include even if method has no effect on the Section 313 chemical
- Only data element in Form R focusing on the entire waste stream rather than the Section 313 chemical in the waste stream



SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3 character code(s)]	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data?
7A.1a	7A.1b 1. 2. 3. 4. 5. 6. 7. 8.	7A.1c	7A.1d %	7A.1e Yes ☐ No ☐

PART II. SECTION 7A: ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

- Section 7A.a General waste stream
  - Enter a waste stream code for each waste treatment method sequence
    - There are four waste stream types: Gaseous, Wastewater, Liquid Waste, Solid Waste
- Section 7A.b Waste treatment method(s) sequence
  - Enter code(s) from EPA's *TRI Reporting Forms and Instructions* document for on-site waste treatment method(s) used
  - Enter code(s) regardless of whether waste treatment actually affected the Section 313 chemical
  - Report waste treatment method(s) used on aggregate waste stream as single stream
  - If applicable, enter codes in sequence in which they occur

PART II. SECTION 7A: ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

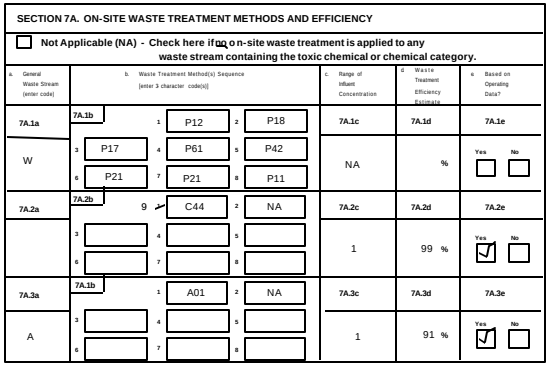
- Section 7A.c Range of influent concentration
  - Use range of concentration of the Section 313 chemical in waste stream as it typically enters treatment equipment
  - Enter code(s) for concentration ranges (parts per million) from EPA's *TRI Reporting Forms and Instructions* document
- Section 7A.d Waste treatment efficiency estimate
  - Waste treatment efficiency expressed as percent removal of the Section 313 chemical from waste stream through biological degradation, chemical conversion, or physical removal
    - Use overall efficiency of waste treatment sequence, not a specific waste treatment method
    - Use percent removal or destruction of Section 313 chemical only, not other constituents of the waste stream

PART II. SECTION 7A: ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

- **Section 7A.e Based on Operating Data?**
  - Check "yes" if efficiency estimate is based on monitoring from typical operating conditions
  - Check "no" if efficiency estimate is based on published data for similar processes or equipment supplier's literature, or if the influent or effluent waste comparison or the flow rate was otherwise estimated

PART II. SECTION 7A: ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

- **Procedures for using two lines of data to enter 9 or more sequential waste treatment methods**



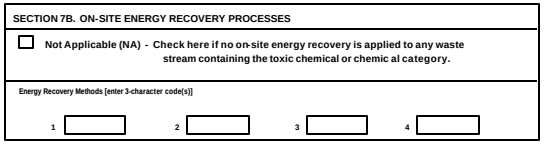
SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3 character code(s)]	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data?
7A.1a	7A.1b: 1 P12, 2 P18, 3 P17, 4 P61, 5 P42, 6 P21, 7 P21, 8 P11	7A.1c	7A.1d	7A.1e
W		NA	%	Yes ☐ No ☐
7A.2a	7A.2b: 9 C44, 2 NA, 3, 4, 5, 6, 7, 8	7A.2c	7A.2d	7A.2e
		1	99 %	Yes ☑ No ☐
7A.3a	7A.1b: 1 A01, 2 NA, 3, 4, 5, 6, 7, 8	7A.3c	7A.3d	7A.3e
A		1	91 %	Yes ☑ No ☐

PART II. SECTION 7B: ON-SITE ENERGY RECOVERY PROCESSES

- **Enter on-site energy recovery methods for Section 313 chemical**
  - Section 313 chemical must be combustible and have a significant heating value (e.g., 5,000 BTU/lb.)
  - Combustion unit is integrated into an energy recovery system (e.g., industrial furnace, industrial kiln, or boiler)
- **Enter codes in descending order by quantities combusted**



SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

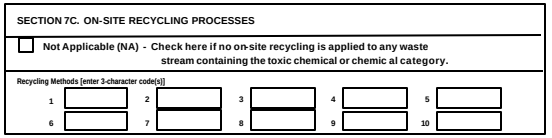
☐ Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemic al category.

Energy Recovery Methods [enter 3-character code(s)]

1 ☐ 2 ☐ 3 ☐ 4 ☐

PART II. SECTION 7C: ON-SITE RECYCLING PROCESSES

- **Enter methods used for on-site recycling of the Section 313 chemical**
  - Codes for recycling methods used are found in EPA's *TRI Reporting Forms and Instructions* document
  - Do not include energy recovery processes
- **Enter codes in descending order by quantities recycled**



SECTION 7C. ON-SITE RECYCLING PROCESSES

☐ Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemic al category.

Recycling Methods [enter 3-character code(s)]

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

PHOTOCOPYING PAGES OF FORM R

- Form R pages may be photocopied if additional space is necessary to complete these sections (photocopying is not necessary with TRI-ME/ATRS)
  - Section 6.1: Transfers to POTWs
  - Section 6.2: Transfers to Other Off-Site Locations
  - Section 7A: Waste Treatment Methods and Efficiency
- When photocopying pages, you must complete the box on each page to indicate the number of copies you are attaching
- For the page being photocopied, enter in the left box the total number of pages submitted including the original

  original + number photocopied = total pages submitted

  - In the second box, indicate the position of the individual page

Example:

If additional pages of Part II, Sections 6.2/7A are attached, indicate the total number of pages in this box [2] and indicate which Part II, Sections 6.2/7A page this is, here. [1] (example: 1.2.3. etc.)

BEST PRACTICE: RECORDKEEPING

- Importance of good recordkeeping
  - Detailed records improve reporting accuracy and data quality
  - Well-labeled calculations and engineering assumptions serve as standard operating procedures for future years
    - » Reduce replication
    - » Ensure consistency
- Requirements
  - All records used to complete Form R reports must be kept for three years (40 CFR 372.10)
  - EPA will review records during a data quality audit

REFERENCE SOURCES

- *Estimating Releases and Waste Treatment Efficiencies*
- EPA Industry Guidance located at http://www.epa.gov/tri
- *AP-42: Compilation of Air Pollutant Emission Factors* located at http://www.epa.gov/ttn/chief
- Technology Transfer Network located at http://www.epa.gov/ttn
  - AP-42
  - WATER9 program
    - » Updates WATER8, CHEMDAT8, and CHEM9
  - TANKS program
- *Perry's Chemical Engineer's Handbook; CRC Handbook of Chemistry and Physics; Lange's Handbook of Chemistry*